

PITUITARY GLAND VOLUME MEASURED BY MAGNETIC RESONANCE IMAGING AS DIAGNOSTIC PREDICTOR OF PERSISTENT CHILDHOOD-ONSET GROWTH HORMONE DEFICIENCY

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Background

Pituitary imaging is important for the evaluation of hypothalamo-pituitary axis defects in patients diagnosed with childhood-onset growth hormone deficiency (CO-GHD). Published evidence shows that there is a close relationship between structural changes in the pituitary gland and growth hormone deficiency.

Aims

To evaluate the relationship between clinical, laboratory and magnetic resonance imaging of the pituitary gland in a cohort of CO-GHD patients during the transition period, and to assess the value of pituitary volume as a diagnostic predictor of persistent GHD.

Methods

Retrospective case review of patients diagnosed with CO-GHD referred to our adolescent unit between 2012 and 2020.

- Adult GHD (AGHD) was defined as a stimulated growth hormone peak < 3 µg/l.
- Published normative data on pituitary diameters was used to calculate pituitary volumes (Volume = Height × coronal length × sagittal width × 0.5 mm³)¹

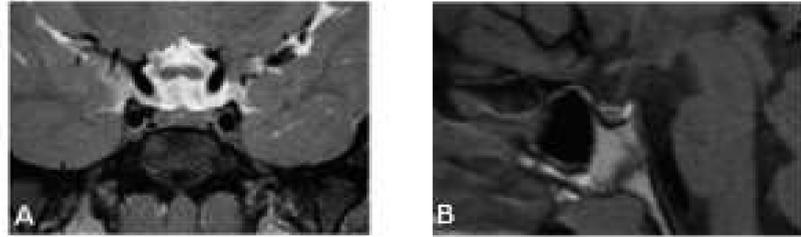


Image 1: Pituitary volume measurement
(A) Height and length of the pituitary gland on coronal plane
(B) Width of the pituitary gland on sagittal plane.

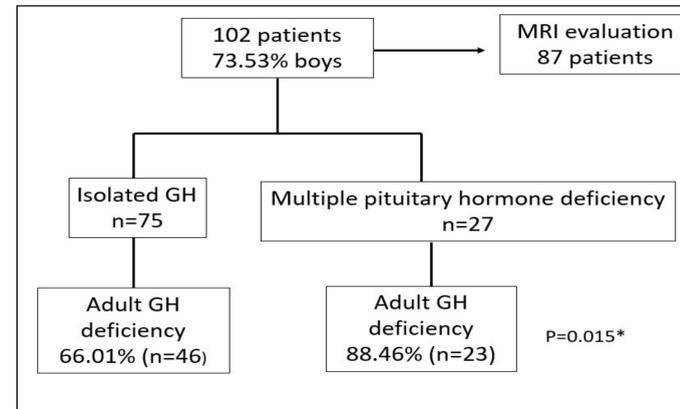
¹ Sebahattin Sari et al. Measures of pituitary gland and stalk: from neonate to adolescence. J Pediatr Endocr Met 2014; 27(11-12): 1071-76.

Results

Patients

Data from 102 individuals (75 males) who underwent retesting of growth hormone reserve at 18.04 years of age (IQR:17.1-19.1) was analysed.

Assessment of growth hormone reserve in adulthood



Pituitary Volume Assessment (Table 1)

Pituitary volume was negatively correlated with:

- Multiple pituitary hormone deficiency (MPHD) (p:0.006*)
- Persistence of growth hormone deficiency in adulthood (p:0.024*)

Anatomically normal pituitary gland did not decrease the likelihood of being diagnosed with AGHD

MRI findings	Non AGHD	AGHD	P value
Pituitary volume (SD)	0.3 ±1.28	-0.47 ±1.36	0.024*
Anatomically normal pituitary gland	57.1%	76.4%	0.055
Abnormal posterior pituitary gland (APP)	60 %	92.6 %	0.021*
Combined Small anterior pituitary gland and abnormal posterior pituitary gland	62.7 %	91.7%	0.007*
Septo Optic Dysplasia	67.6 %	81.3 %	0.281
IGF-1 off treatment (SD)	0.73 ±1.31	-0.67 ±2.11	0.001*

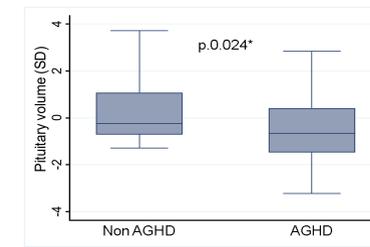
Table 1

Results

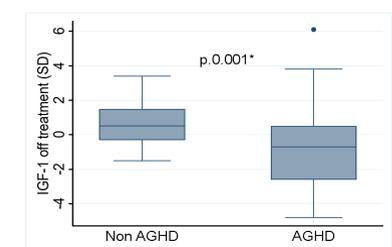
Predictive Value of Pituitary Volume

Multivariate analysis of logistic regression suggested that pituitary volume, MPHD and IGF1 (SD) off GH therapy are good predictors of AGHD ([SE 88.5 %, SP 27.3%] p 0.02*)

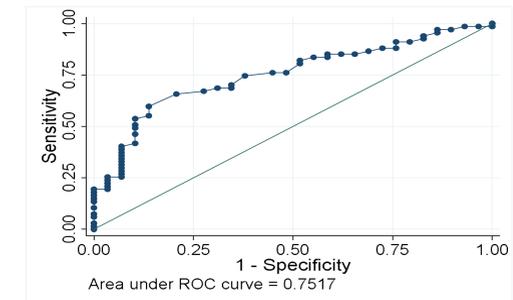
Pituitary volume (SD)¹



IGF-1 off GH treatment (SD)



ROC curve



Key message

- Measurement of pituitary gland volume by MRI combined with IGF-1 concentrations off GH treatment, could help clinicians to rationalise the extent of GH axis re-assessment in patients with IGHD/MPHD at transition

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